Dr. Pavy's first communication to the Royal Society was in 1855, and was entitled "An experimental inquiry into the nature of the metamorphosis of saccharine matter as a normal process of the animal economy." In this he gave reasons for believing that the sugar formed in the liver is not entirely destroyed by combustion in the body, but is changed by means of fermentation. This was followed in 1858 and 1860 by accounts of an "Experimental inquiry into the alleged sugar-forming function of the liver." In these he demonstrated that the large amount of sugar found in the blood returning from the liver was not, as Bernard supposed, present during life, but was really the result of a transformation of the glycogen taking place with great rapidity after death.

In subsequent papers he showed the influence upon the formation of sugar in the blood, of the injection of alkalis, and of acids, into the circulation. Claude Bernard had shown that a lesion of a certain part of the fourth ventricle would cause glycosuria; in 1859 Pavy, in a communication "On the lesions of the nervous system producing diabetes," demonstrated that the same change in the urine was brought about by removal of the superior cervical ganglion, or the division of the sympathetic trunk in the neck. He referred this appearance of sugar to an alteration in the vasomotor apparatus of the liver. In 1863 he was led to ask why the gastric secretions did not in health digest the gastric mucous membrane itself; and from a series of ingenious experiments he drew the inference that this was due to the circulation in the stomach walls of an alkaline blood which was sufficient to neutralise the acid gastric juice, coming into contact with the mucous membrane.

In the same year, Dr. Pavy was elected a Fellow of the Royal Society, and so far as communications to this society were concerned he appears to have rested on his oars for several years. Not that he was idle; far from it. He was for a time demonstrator of anatomy at Guy's Hospital. Within two or three years of graduation, he was appointed lecturer on physiology and comparative anatomy, and he continued his lectures on physiology until 1878, for the last five years in conjunction with Dr. Pye-Smith. In 1859 he was appointed assistant physician to Guy's Hospital, and in 1871 he became full physician. In 1862 appeared his work entitled "Researches on the Nature and Treatment of Diabetes," and he soon acquired a large professional practice among sufferers from that complaint.

Dr. Pavy did not, however, confine himself to the subject of diabetes; he did valuable work in connection with the forms of functional albuminuria, and he wrote a "Treatise on the Function of Digestion." This was followed in 1874 by a "Treatise on Food and Dietetics," which was a standard book for many years. In 1890, at the age of sixty-one, he retired from hospital work at Guy's, but he still enjoyed a large private practice, held the offices of censor and Harveian orator at the Royal College of Physicians, and continued unintermittingly and with dogged perseverance his researches upon the destination of sugar and other carbohydrates in the animal system. In 1875 he read a paper before the Royal Society "On the production of glycosuria by the effect of oxygenated blood on the liver," and in the following ten years he read as many papers bearing on the carbohydrates and diabetes. He made many practical additions to the chemistry of the subject, and his introduction of an ammoniated cupric test in the volumetric estimation of sugar was undoubtedly of great value.

Dr. Pavy has made numerous other communications to medical journals on these subjects; he published in 1894 a "Treatise on the Physiology of the Carbohydrates," and in 1908 delivered three lectures "On the pathology and treatment of diabetes viewed by the light of present-day knowledge." In all this later work he insists on the fact that carbohydrates can be both derived from, and converted into, proteid, as one of great importance in relation to diabetes.

Dr. Pavy's work was well known abroad, and he was the recipient of several honours. He was a corresponding member of the Société d'Anatomie of Paris; and in 1908 the Academy of Medicine of Paris awarded the Godard prize to his work on carbohydrate metabolism on diabetes. In 1901 he was awarded the Baly medal by the Royal College of Physicians of London. FREDERICK TAYLOR.

NOTES.

EXHAUSTIVE tests have been made during the last two weeks by Mr. A. W. Sharman with instruments invented by him for telephoning through water without wires. A small telephone station has been erected in a room in an hotel on the cliffs at Pegwell Bay, and the other station has been fitted up on a motor-boat cruising in various parts of the bay. The microphone used in speaking is connected in series with a battery of four or five dry cells and an impulse coil, the coil being of special construction and giving very short induced currents of high potential, which are communicated to the water by two wires connected to the terminals of the coil and terminating themselves in plates buried in the sand or submerged in the water. Two similar plates, connected direct with a very low resistance telephone receiver, enable the speech to be "picked up" at distances of a mile and more. The speech transmitted through the water has been very distinct, and the system has shown good possibilities of its being used as a means of verbal communication between two ships, such as a battleship and a submarine. The effect is very directional; and another advantage is that, with a small tuned buzzer, telegraphic signals can be transmitted through the earth or water for a distance of several miles; the primary energy required is extremely small, four watts sufficing to telephone over a distance of two miles. Experiments are also being made in combining with the Sharman instruments a sensitive telephone receiver invented by Mr. T. Thorne Baker, with which it is hoped the present range may be increased by 50 per cent. or more.

THE naval dirigible, an experimental airship which has been building at Messrs. Vickers' works, Barrow, for the Admiralty, during the last two years, was wrecked on Sunday, September 24, while being towed out into the centre of Cavendish Dock in preparation for a flight. The vessel, which is of the Zeppelin type, is 510 feet long, 45 feet in diameter, and of a capacity of 20,000 cubic metres. The rigid framework, containing seventeen separate gas-bags, is constructed of a new alloy known as "duralumin." Each of the gondolas, fore and aft, contains a 200 horse-power Wolseley motor, the motor in front driving two propellers on either side, and that in the rear driving one propeller placed behind the gondola. The accident started so soon as the order to begin to veer the bow round towards the centre of the dock was obeyed. The ship bulged and broke by her seventh, eighth, and ninth gas-bags, approximately in the middle. The outer fabric fortunately held, enabling both portions to be secured and eventually returned to the shed, without injury to the crew, though several men were obliged to swim for safety. The exact cause of the accident is unknown, nor is it likely to be made public. Structural weakness would seem to account for it, coupled with the fact that the keel, which originally ran the length of the vessel between the two gondolas, had been removed in order to lighten her.

THE Aëronautical Society of Great Britain at a special general meeting held on Monday, September 25, passed resolutions repealing its old constitution, under which it has been governed for forty-five years past, and substituting a new one, which provides for the creation of a technical side in addition to the lay or members' side. Fellowships and associate fellowships are to be granted to those respectively of considerable eminence and of an acknowledged position in the science of aëronautics, and special encouragement is to be given to students, for whom there is a separate grade. The growth of aëronautical engineering as a profession is the chief cause for this change, which, it is hoped, will give a much needed fillip to aëronautical industry, besides protecting and fostering its interests. The new council was also elected at the meeting, and is composed of the following:—A. E. Berriman, Griffith Brewer, Captain A. D. Carden, T. W. K. Clarke, B. G. Cooper, J. W. Dunne, J. Dunville, J. H. Ledeboer, Captain E. M. Maitland, F. K. McClean, Lord Montagu of Beaulieu, A. Ogilvie, M. O'Gorman, F. Handley Page, Colonel H. E. Rawson, and Colonel F. S. Stone.

NEWS has been received at the Royal Geographical Society that the International Geographical Congress, which was to have been held at Rome next month, has been postponed until the spring of 1912.

THE Secretary of State for the Colonies has appointed Sir Ronald Ross, K.C.B., F.R.S., professor of tropical medicine in the University of Liverpool, to be a member of the Advisory Medical and Sanitary Committee for Tropical Africa, in succession to the late Sir Rubert Boyce, F.R.S.

MR. A. P. TROTTER informs us that his name has been attached to the Report of the British Association Committee on Practical Standards for Electrical Measurements without his authority, and doubtless as the result of a mistake. But it compels him to state that he withdrew from the committee in July, 1910, because he strongly disagreed with some of its resolutions and with the mode in which the business was conducted.

CIRCUMSTANCES have arisen which have led to the abandonment of the arrangements made to hold the autumn meeting of the Iron and Steel Institute in Turin. The meeting will be held, therefore, at the Institution of Civil Engineers, Great George Street, Westminster, on October 5. Among the papers which have been submitted, a selection of which will be read and discussed, may be mentioned:—Reports on the iron-ore resources of Italy: (*a*) Sardinia, by Ing. L. Testa, (*b*) Brembana Valley, by Cav. G. Calvi, (*c*) central Italy, by Ing. A. Ciampi, (*d*) southern Italy and the island dependencies, by Prof. G. la Valle; on the mechanical influence of carbon on alloys of iron and manganese, by Prof. J. O. Arnold and Mr. F. K. Knowles, of Sheffield; on the autogenous welding of metals, by Dr. Francesco Carnevali, of Turin; on the application of electric energy to the manufacture of iron and steel in Italy, by Cav. Ing. Remo Catani, of Rome; on the present state of the metallurgical industry of Italy, by Signor Comm. Luigi Dompé and Cav. Francesco Saverio Pucci, of Milan. Papers will be submitted also by Mr. E. Adamson, of Sheffield; Mr. L. L. Fermor, of Calcutta; Prof. Federico Giolitti, of Turin; Prof. F. Giolitti and Dr. Francesco Carnevali, of Turin; M. L. Grenet, of Argenteuil, France; and M. V. A. Kroll, of Luxembourg.

DR. C. H. WIND, professor of theoretical physics at Utrecht University, died on August 7, after a long illness, at the age of forty-three. Prof. E. v. Everdingen, director of the Royal Netherlands Meteorological Institute at de Bilt, sends us the following particulars of Dr. Wind's career and scientific work:—Cornelis Harm Wind was born at Groningen, and studied physics and mathematics there and at Leyden and Berlin (1886–95), and physical chemistry with van 't Hoff at Amsterdam (1895). He was then appointed lector in theoretical physics and physical chemistry at Groningen. In 1902 the Government, desiring to encourage the application of theoretical physics to the solution of meteorological problems, appointed Wind as director of the Meteorological Institute at de Bilt. As such he reorganised the practical work, devised schemes for extensions in terrestrial magnetism, seismology, and kite work, and introduced many improvements in the regular publications. In 1904, however, when the time for theoretical work had scarcely arrived, he was called upon to take the chair of theoretical physics at Utrecht, and accepted the invitation, not without much hesitation. Wind's theoretical work of the Groningen period promised a brilliant career. His work on magneto-optics led him to predict an analogue to Kerr's phenomenon, afterwards verified by Zeeman. Haga and Wind's experimental researches on diffraction of Röntgen rays induced him to investigate the explanation of diffraction phenomena generally. Other researches consider Gibbs's phase rule, the kinetic theory of gases, and the second law of thermodynamics. Also one part of Bosscha's text-book of physics was written by him in this period. Unhappily, at Utrecht his health began to give way and prevented further development in this direction. Nevertheless, he continued to show great interest in geophysical problems as a member of the board of visitors of the Institute for Marine Investigations, afterwards also of that of the Meteorological Institute. Those who met him at the meetings of the Permanent International Council for the Investigation of the Sea will remember his activity in organising the hydrographical work. His many friends and colleagues who remember his keen interest in their affairs and work whenever they asked his advice know that, though his life was too short, it was not in vain.

IN his pamphlet, "The Stone Age and Lake Lothing" (Norwich: Norfolk News Co., Ltd.), Mr. J. Chambers says:—"My intention was to write a brief notice of the flint implements I found lately when excavating in the bed of Lake Lothing, at Lowestoft." Beyond a few remarks on various methods of identifying stone implements, the author's intention has not been carried out. His remarks on the history of the lake are interesting, but he leaves the very subjects on which he has some valuable first-hand information to dabble in place-name speculations, the value of which may be estimated by his list of "acknowledged authorities."

IN the September issue of *Man* Messrs. W. L. H. Duckworth and L. R. Shore describe a collection of crania derived from the peat deposits, which are now deposited in the Cambridge University Museum. While, as regards the mammalian fauna, the type from the peat deposits is certainly distinctive, there is great diversity in the cranial forms. Two of these crania tend to intrude among those of the prehistoric age; but this association is with examples the Palæolithic origin of which is not universally accepted. It seems at the same time certain that this collection contains examples somewhat unusual when judged by the three standard tests—the calvarial height index, the bregmatic angle, and the lambda angle—when compared with modern European crania. In view of the doubts still expressed by some authorities regarding the crania from Galley Hill and Brünn, the problem of the connection of them with the peat-deposit examples must remain somewhat uncertain.

The Museums Journal for September contains an interesting article by Mr. H. Stuart Page on the evolution of English pottery, with valuable suggestions for the preparation of a type collection. He begins his survey with the old English slip-ware made at the end of the seventeenth and the beginning of the eighteenth centuries. He points out that the advent of Oriental porcelain entirely changed the outlook of the English potter. This was introduced by the East India Company when the custom of tea-drinking was becoming established in this country, and we can easily realise how wonderfully beautiful these thin, white, glossy, transparent vessels must have appeared to people who were then daily using the home-made coarse utensils. From a valuable chart appended to this paper we can understand the subsequent course of evolution. In dealing with the preparation of a type collection, Mr. Page warns his fellow-curators that they must not attempt to compete with private collectors in purchasing specimens which from their rarity have acquired a high fictitious value. Only the educational needs of a museum should be kept in view, and a collection of less than a hundred pieces carefully selected, arranged in the position for which they were designed, and fully labelled, would, he suggests, be sufficient for the purpose. As the Board of Education is now prepared to give financial aid in the formation of such type collections, it is the duty of curators to select their examples with discrimination. Such a scheme should commend itself to those museums where space and funds are limited, and in those places where a large number of specimens already exist; the idea could be carried out so as to serve the place of an index to the main collection.

IN *Phytopathology* (vol. i., No. 3), Mr. J. R. Johnston states that the *Bacillus coli* (the common microbe present in the intestinal tract of man and most animals), when inoculated into coconut plants, is capable of destroying the soft tissues. The *B. coli*, or a form indistinguishable from it, is also the cause of "bud-rot," a disease of the coconut plant.

JUDGING from the report for 1910, the Sarawak Museum seems to be doing its work, in the matter of the fauna and flora of Borneo, in a thoroughly efficient manner. In addition to duplicates, the museum contains 40,975 named specimens of Bornean animals, referable to 5852 species and subspecies. Besides these, there are between 4000 and 5000 forms not yet properly named. His Highness the Raja has sanctioned the building of a new wing, which when complete will make the museum two-thirds as large again as at present. Arrangements have been made for the publication of a Sarawak Museum Journal, of which the first part was expected to appear in February last.

MUCH interesting information with regard to the economic products of India is to be found in the report of the Industrial Section of the Indian Museum for 1910–11, more especially in the part dealing with the work of the laboratory. Among the items, reference may be made to the analysis of a sample of Para rubber, the yield of *Hevea brasiliensis*, grown at Darjiling, this rubber being of good quality. On the other hand, rubber from *Ficus altissima*, grown in Assam, proved unsatisfactory. The tree in question is referred to as *Ficus altissima*, Bl., var. *typica*, King; but such a reference, even if it be generally used in botany, is incorrect, as *Ficus altissima typica* (to use the zoological form of nomenclature) is clearly the original type described by Blanford. Experiments as to the suitability of Indian fish-oils for the dressing of jute are likewise discussed, and it has been found that such oils, which in some cases must be diluted with mineral oil, would be satisfactory for this purpose if they could be produced at a sufficiently low price. An outbreak of beri-beri in Bengal led to the analysis of samples of rice, which showed that while husked rice contained from 0·6 to 0·8 per cent. of phosphoric anhydride, "polished" grain contained an average of only 0·4 per cent., which in some samples was reduced to from 0·26 to 0·22 per cent.

To *The American Naturalist* for September Mr. T. Barbour contributes a translation of an important article, by Dr. P. N. van Kampen, on the zoogeography of the East Indian Archipelago, originally published in Dutch in *Natuurkundig Tijdschrift voor Nederlandsch-Indië* for 1909. By means of maps of the distribution of mammals, amphibians, and fresh-water fishes it is shown that Wallace's line "has no value as a zoogeographic boundary," and that nearly the entire eastern half of the archipelago must be regarded as a transition area between the Oriental and Australian regions, the boundaries of which cannot be defined. After reference to the theory that the Australian fauna came from South America, it is concluded "that in post-Cretacean times there was a broad connection between the three Greater Sunda Islands and Asia on the one hand, and between New Guinea and Australia on the other; that, further, also between the Sunda Islands and New Guinea a connection must have existed, which was really less easy to pass over." Celebes is considered to possess an impoverished Indian fauna, due to the absence of free connection with the larger western isles, this poverty being most noticeable in the case of fishes. Its fauna may be the result of the consolidation of smaller islands, which were supplied by feeding lines from islands to the south, north, and east. "It is peculiar that the truly Indian character of Celebes remained unsuspected so long; while, on the other hand, no one doubted, but rather laid stress upon, the Australian relationship of that vast easterly island, New Guinea, the fauna of which is fully as Indian as that of Celebes is Australian." An African element is supposed to be represented in Celebes by the black ape (Cynopithecus) and the babirusa, the former being considered to be related to the baboons and the latter to the wart-hog. The evidence for this seems, however, inconclusive.

THE new regulations for recruitment of the Indian Imperial Forest Service are published in *The Indian Forester* (August), with some cogent criticisms not altogether favourable. The substitution of several recognised training schools in place of a definite establishment at Oxford does not meet with favour, but the appointment of a member, retired or active, of the Indian forest department as a controlling director is regarded as a hopeful arrangement. Coincidently the number contains a communication issued by the Government of India revising the regulations for the training of provincial candidates at the Forest College, Dehra Dun.

A REVISION of the small liliaceous tribe Nolineæ, intermediate between the Yucceæ and Dracæneæ, has been prepared by Dr. W. Trelease, and is published in the Proceedings of the American Philosophical Society (vol. l., No. 200). The author recognises four genera by the inclusion of the monotypic genus Calibanus, founded on Hooker's *Dasylirion Hartwegianum.* Ovary and fruit furnish characters distinguishing the genera Nolina, Calibanus, Beaucarnea, and Dasylirion. The species are pronounced xerophytes with a succulent caudex; some of them reach tree size, as *Nolina longifolia* and *Beaucarnea gracilis* that are illustrated. The focal centre of the tribe lies on the Mexican tableland, with a distribution southwards to Central America and northwards to California and Colorado. Half the species are assigned to Nolina, and only seven are placed under Beaucarnea.

Among the sixty-eight parts mapped out in connection with the Clare Island Survey, one of the earliest and a most interesting number is the graphic account of the lichens contributed by Miss A. Lorrain Smith. The region of rock, moorland, and sea coast on Clare Island and the adjacent mainland is particularly favourable to their development. The seaward rocks are clothed with black *Verrucaria maura*; *Ramalina scopulorum* and *Ramalina cuspidata* grow within reach of the spray, and *Physica parietina* gives colour to the boulders; proceeding inland, *Lecanora parella* and *Lecanora atra* are first prominent, and then *Lecidea rivulosa*. The peaty soil carries fine growths of Cladonia and Stereocaulon, and in the grass species of Peltigera are abundant. The present list, not regarded as exhaustive, enumerates 280 species, of which only about thirty were previously recorded for the county, while the new records for Ireland approximate to this figure. The rarer species include *Arthopyrenia leptotera*, *A. microspila*, *Arthonia subvarians*, *Microthelia dissepta*, and the alpine *Pertusaria gyrocheila*.

The reopening of the old alluvial goldfield in eastern Sutherland was referred to in Nature of July 13 (p. 51). It was then remarked that gold was being obtained, but whether it occurs in paying quantities had still to be proved. Information recently received from the field shows that the experiment has been a financial failure, but fresh attempts are being made at another locality.

The twelfth half-yearly review of mining operations in South Australia records the further development of the Tanami Goldfield in the Northern Territory, and states that instructions for the provision of a battery have been given by the Minister for Mines. The most important mineral product of South Australia is copper, and owing to its low price during the half-year copper mining had not been active. Further progress is being made in the development of the carnotite lode at Radium Hill, and the manufacture of gas fire-blocks has begun a fresh use of the extensive china-clay deposits of South Australia.

In the September number of *The Scottish Geographical Magazine* there appears a paper on the plant geography of Ardgoil, a public park of the Corporation of Glasgow, comprising some 14,000 acres, bordering on Loch Long and Loch Goil. Maintained in its natural condition of a Highland estate, it offers an excellent field for the study of such problems; and Mr. T. Nisbet's paper, read to the geographical section of the Royal Philosophical Society of Glasgow, is an excellent example of the useful work which can be done in local investigations. The present distribution of trees and plants is compared with the records in early statistical accounts, and the controlling influence of the greater hillside and glen population which existed a century and more ago is pointed out.

In the Proceedings of the Royal Irish Academy Prof. G. A. J. Cole describes the glacial features in Spitsbergen, and compares them with such as are to be seen in Ireland, where we associate with the waning of the Irish Ice age. The general appearance of aridity in the form and manner of weathering in Spitsbergen is very striking, and the action of penetrating water and repeated frosts leads to a rapid destruction of the rock, often forming cirque-like basins on the hill-slopes. Such cirques, illustrations of the arid type of weathering, Boulder-clay, and fluvio-glacial deposits are well shown by photographs taken by the author, who discusses the possibility of somewhat similar conditions having existed over Ireland during the Glacial period.

A correspondent asks what is "teart land," for the investigation of which the Development Commissioners have made a grant. The use of the word "teart" in connection with certain soils was referred to in Nature of November 3, 1910 (p. 25), and of May 11, 1911 (p. 364), both times in reference to Mr. C. T. Gimingham's very promising work on problems presented by such lands. Dr. E. J. Russell informs us that the word is used to denote certain pastures in Somersetshire on which cattle "scour," or get diarrhœa badly, whilst on other pastures round about they remain perfectly healthy. Botanical examination of the pastures reveals nothing that can account for the scouring, nor is there any evidence of disease organisms. Only the Lower Lias formation is affected, alluvial pastures all round a Lias pasture being quite sound. The whole problem is very baffling and extraordinary, but it is typical of many other pasture problems which require investigation.

In the August number of *La Géographie* M. Paul Mougin discusses the snowfall in Savoy. The material available includes many references to the deficiency or excess of snowfall in different years, and by research among the documents preserved in the official centres of the province a large amount of information has been collected which reaches back for many years. But such data are but approximate, and are only available for exceptional years; nevertheless, from 1773 onwards the dates of the earliest and latest snowfalls have been recorded at Annecy. Taking the mean dates for each twenty-five years, there seems to have been a maximum annual duration of snow in the period 1801–25, since when it has decreased. It is pointed out that this corresponds with the maximum extension of the glaciers in 1818–20, and do not contradict their retreat, which commenced after 1863. From 1853 the depth of snow falling in each year has been recorded at Annecy, and since 1900 the Administration des Eaux et Forêts has considerably increased the number of observing stations. From such data M. Mougin discusses the increase of snowfall with altitude, and the marked increase recorded in passing from north to south. There are also localities of exceptionally heavy snowfall which are not on the highest parts of the mountain range.

The interesting weather charts of the North Atlantic for September 7–13, prepared from radio-telegrams and other data, and published in the first issue of the valuable monthly meteorological charts for October by the Meteorological Office, show that the distribution of barometric pressure was subject to considerable variation. The chief features were the movement of high and low systems, generally of small intensity, across America to the Atlantic, and their subsequent tracks across the ocean. At the close of the period the eastern half of the Atlantic was under the influence of a very large high-pressure system extending from Greenland and Iceland southward to the edge of the tropics, and the office was enabled to predict successfully a continuance of these conditions for some days. On the same chart it is notified that the French Meteorological Office has commenced the dispatch of wireless messages from the Eiffel Tower, at 11h. a.m. daily, for the benefit of shipping in the Atlantic. The reports consist of barometric readings, wind direction and force, and state of sea at six stations in western Europe, Iceland, Azores, and Miquelon (Newfoundland), to which a general summary of the weather is added, *e.g.* "Anticyclone over central Europe, fine weather general; depression west of Iceland, travelling toward the east."

In view of the extensive use which is made of sulphur as an insulator in electroscopes used in ionisation observations, a note in the August number of *Le Radium*, by Mr. F. W. Bates, of the University of Montreal, on the effect of light on the insulating properties of sulphur will be read with interest. Mr. Bates finds that when exposed to light sulphur becomes slightly conducting, the conductivity increasing as the intensity of the light increases. This property, he finds, is shared to a small extent by ebonite, but amber appears unaffected by light. He considers that the importance of the subject justifies a more extended study of it, and this he has commenced.

PROF. A. RIGHI has two interesting papers in vol. xiv. of the *Mem. della R. Accad. di Bologna.* The first deals with the ionisation produced by the magneto-kathode rays. It is found as the rays are more strongly developed, by increasing the axial magnetic field, that the ionisation at a given point in their path is diminished. The explanaton of this effect follows simply from the mode of formation of the rays; the field holds in loose combination pairs of oppositely charged ions which would otherwise escape from each other's attraction, the number of free ions in the discharge tube is therefore diminished. Sir J. J. Thomson has shown how complex are the phenomena in the region in which the canal rays are usually studied; it therefore seems possible that other plausible explanations could be given of the observed effects. The second of the two papers deals with less explored ground, viz. the influence of a magnetic field on the sparking potential. The results here are so complicated that Prof. Righi thinks more data will have to be collected before an explanation can be given. As the magnetic field is increased the sparking potential falls to a minimum, then rises to a maximum, and finally decreases very slowly. The magnetic and electric fields are parallel. Of other papers of physical interest, one by Prof. Amaduzzi deals with the photoelectric effect in selenium, while Prof. P. Burgatti treats of the vortical motion of a liquid, using vector analysis.

WE have received from the Patent Office Library a new "Subject List of Works on Chemistry (including Alchemy, Electrochemistry, and Radio-activity) in the Library of the Patent Office." It is a work of 218 pages, and supersedes a list published in 1901. A valuable feature of the list is the use of the dates of the volumes as one of the chief items in the scheme of classification; under this system it is easy to follow the gradual development of a subject or process, and new publications fall naturally into their proper places at the end of the series. The classification is somewhat complex, and some practice would be needed to trace quickly the volumes that one wished to consult; but this is perhaps inevitable in view of the bewildering array of books, journals, theses, dictionaries, and pamphlets which compose the literature of chemistry.

A PAPER by M. Paul Sabatier on hydrogenation and dehydrogenation by catalysis has recently appeared in the *Revue Scientifique.* Originally delivered in the form of a lecture to the German Chemical Society, the paper contains a review of the new and important branch of organic chemistry which has been developed during the past twelve years by the author and his colleagues. The catalytic action of the metals, and especially of finely divided nickel, has been utilised in a very large number of organic changes, and has proved of peculiar value in the addition and removal of hydrogen; more recently the catalytic influence of a number of oxides, such as thorium dioxide, has been investigated, and has proved to be of great service in effecting processes of condensation, such as the conversion of acids into ketones, and of alcohols into thiols, esters, ethers, and amines. The summary now given is both opportune and useful.

THE solubility of hydrogen in copper, nickel, and iron is the subject of a communication by A. Sieverts to the current number of the *Zeitschrift für physikalische Chemie.* The solubilities were studied for pressures up to 1½ atmospheres, and over the temperature range 400° C. to 1600° C. For a given temperature and pressure it was found that the amount of gas taken up per unit weight of metal was independent of the metal surface. At constant temperature the solubility in both solid and liquid metal is approximately proportional to the square root of the gas pressure; at constant gas pressure the solubility of the hydrogen increases with the temperature, a sudden increase in the amount absorbed taking place at the melting point of the metal. As a consequence of the latter property, there is a spitting when the metal solidifies, copper giving off at its melting point about 2 volumes of hydrogen, iron 7 volumes, and nickel 12 volumes.

THE August issue of the Journal of the Franklin Institute contains a paper by Dr. Charles Baskerville on the chemistry of anæsthetics. In the case of chloroform especially, and to a less extent in the case of other anæsthetics, it is important not merely to ensure the initial purity of the material, but also to store it under such conditions as to prevent the formation of deleterious substances. The deterioration of chloroform is mainly due to oxidation, as shown by the equation

$$CHCl_3+O=COCl_2+HCl.$$

This change is usually checked in the case of anæsthetic chloroform by the addition of alcohol; and it has been shown that the initial oxidation of the mixture proceeds entirely at the expense of the alcohol, and that the chloroform is not attacked until later. Nevertheless, it is desirable to restrict oxidation by storing the liquid in small bottles which can be opened as required, and to make use of anactinic glass; it has even been suggested that the liquid should be stored in contact with nitrogen, and drawn off by means of a syphon, in order to avoid all risk of oxidation.

AN article in *The Engineer* for September 22 deals with hydraulic excavation on the Panama Canal. The method has been borrowed from hydraulic gold-mining as practised in California, and has been used on the largest scale in the area extending southward from the lower locks at Miraflores to opposite Corozal. Some 330,000 cubic yards of alluvial material were disintegrated between October and February last. The chief difficulty experienced during the progress of the work was the frequency with which limbs and trunks of cocoanut trees, washed from the mud several feet below the surface of the ground, were drawn into and choked the suction pumps. When this occurred, a coloured workman dived to the mouth of the pipe and extracted the débris. The cost sheets indicate that the economy of this method of excavation is undoubted.

AN illustrated description of the Trollhättan Hydro-electric Power Station, Sweden, appears in *Engineering* for September 22. This station will represent, when completed, an aggregate of 100,000 horse-power, half of which has just been installed. The Swedish State now controls the entire water-power of the Göta River, which connects Lake Vänern, the largest lake in Sweden, with the sea, there being a difference in level of 144 feet, of which 108 feet occur in the Trollhättan Falls. The present low-water volume is 11,520 cubic feet per second, and the high-level volume of water is about 32,400 cubic feet per second. When Lake Vänern is regulated, the State will be able to reckon on an aggregate of not fewer than 200,000 horse-power at the Göta Falls. The district is at no great distance from Gothenburg, and is in the midst of a populous part of the country. Francis turbines of a nominal capacity of 10,000 horse-power and a maximum capacity of 12,500 horse-power have been installed. The generators produce three-phase current, twenty-five periods, and 10,000 volts. The energy is distributed partly at 10,000 and partly at 50,000 volts.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES FOR OCTOBER:—

Oct. 1. 12h. 4m. Uranus in conjunction with the Moon (Uranus 4° 44′ N.).
4. 5h. 0m. Venus stationary.
5. 15h. 0m. Uranus stationary.
10. 6h. 28m. Saturn in conjunction with the Moon (Saturn 4° 27′ S.).
11. 17h. 52m. Mars in conjunction with the Moon (Mars 4° 21′ S.).
17. 12h. 0m. Mars stationary.
,, 19h. 0m. Neptune at quadrature to the Sun.
19. 12h. 0m. Uranus ,, ,,
21. 15h. 55m. Sun eclipsed, invisible at Greenwich.
22. 4h. 0m. Venus at greatest brilliancy.
23. 9h. 0m. Mercury in superior conjunction with the Sun.
,, 11h. 31m. Jupiter in conjunction with the Moon (Jupiter 2° 40′ N.).
27. 14h. 0m. Neptune stationary.
28. 20h. 40m. Uranus in conjunction with the Moon (Uranus 4° 48′ N.).

ANOTHER NEW COMET, 1911*f*.—A telegram from the Kiel Centralstelle announces the discovery of a new comet by M. Quénisset, at Juvisy, on September 23. Its position at 10h. 25m. (Juvisy M.T.) was

R.A.=14h. 24·8m., dec.=75° 4′ N.,

and its daily movement was +3·8m. in R.A. and −2° 11′ in declination.

We also learn that this comet was discovered independently by Mr. Francis Brown, of Lee, S.E., on Sunday, September 24, at 9 p.m. Mr. Brown gives its position then as R.A.=14h. 37m., dec.=73° 40′ N.

The magnitude of the new comet is given as 7·5, and, as it is situated so high up in Ursa Minor, it should not prove a difficult object.

DISCOVERY OF BORRELLY'S COMET (1905 II., 1911*e*).—According to a telegram from the Kiel Centralstelle, the credit of rediscovering Borrelly's comet, for which, as we mentioned in last week's issue, M. Fayet has just published search-ephemerides, belongs to Mr. Knox Shaw, of the Helwan Observatory, Egypt, who found it in R.A. 3h. 46m. 20s., dec. −32° 54′, at 15h. 5m. (Helwan M.T.) on September 19. The discovery was probably made on a photograph taken with the Reynolds 30-inch reflector, which, it will be remembered, was the first instrument to secure a recognised photograph of Halley's comet; the magnitude is given as 13·0.

M. Fayet gave three ephemerides based on the assumptions of perihelion passage taking place on December 18·6, 14·6, or 22·6; the observed position is more nearly in accordance with the first of these. He also shows that by the middle of October the quantity $1 : r^2\Delta^2$ will be as great as it was at the time of the comet's maximum brightness in 1905; after that it will increase considerably, from 0·57 to 1·90, so that the conditions of this return will be much better, for southern observatories, than at the previous apparition.

THE KIESS COMET, 1911*b*.—Numerous observations of comet 1911*b* are published in No. 4525 of the *Astronomische Nachrichten*, all of which direct attention to the diffused nebulous character of this object. On August 11 Herr Ernst, at the Königstuhl Observatory, found the diameter to be 12′, the coma appearing slightly elongated in the direction N.-S., and the nucleus being easy to see.

Dr. Konkoly at O'Gyalla found the three hydrocarbon bands to be very bright, their relative intensities, reckoning from the red, being 0·6, 1·0, and 0·3; a short continuous spectrum passed through the middle of the lines.

Dr. Holetschek gives a list of brightnesses of the whole comet and the nucleus as observed at Vienna, the maximum brightness, 5·5 mag., of the former occurring on August 3, although the greatest estimated magnitude of the nucleus, 7·0, was recorded on July 18.

Photographic observations at Innsbruck indicated possible changes in the extent of the tail on successive nights, and Herr Prey records tails up to ½° in length. Considerable changes of form are also recorded by M. Quénisset, who reproduces an excellent photograph of the comet on a plate accompanying the September number of *L'Astronomie*. This was taken at Juvisy on July 29 with an exposure of 78m., and shows a tail 5½° long issuing as a hard, fine streamer from the centre of the coma; but M. Quénisset records that on August 6, when the tail was fainter and 2½° long, it was strongly eccentric, and certainly appeared to emerge from the northern edge of the coma.

In *La Nature* for September 23 Dr. Mascart discusses the observed form and spectrum of this comet, and directs attention to the method of repeated copying by contact for the purpose of strengthening the fainter details on comet photographs. The advantage accruing from this process is well illustrated by two reproductions of one of the photographs of Halley's comet which he took at Tenerife in April, 1910. That direct from the original negative is very weak and shows little tail, whereas the one from the recopied negative is much stronger and shows a fair amount of tail.

BROOKS'S COMET, 1911*c*.—M. Quénisset also reports that he has taken several photographs of Brooks's comet, which is now such a prominent object in Boötes. Photographs taken on August 24, 25, and 27, the last with 5h. exposure, show a head having a diameter of 12′ or more in a direction perpendicular to that of the tail; the latter feature shows a length of 4°, and is slightly divergent.

THE SPECTRUM OF MOREHOUSE'S COMET (1908*c*).—Count de la Baume Pluvinel and M. Baldet have a paper in No. 2, vol. xxxiv., of *The Astrophysical Journal* in which they discuss twenty-eight negatives of the spectrum of Morehouse's comet, which they photographed at the Juvisy Observatory during October and November, 1908.

The discussion is a very thorough one, in which the authors show that the spectrum of the comet agrees excellently with the spectrum discovered by Prof. Fowler. The doubling of the bands in the cometary as in the laboratory spectra is very striking. The four band-spectra disclosed are attributed by the authors to carbon monoxide, nitrogen at low pressure, cyanogen, and carbon; in addition, there are some fainter radiations, not yet origined. While cyanogen and carbon were restricted to the head, carbon monoxide and nitrogen were distributed throughout the comet. The bands were also studied from the point of view of "series," and the authors find them classifiable into a "strong" and a "weak" series. An excellent reproduction of the spectrum accompanies the paper.

METEOR OBSERVATIONS.—A number of observations of bright meteors are reported in No. 4525 of the *Astronomische Nachrichten*. Mr. Denning gives the paths and velocities of eleven meteors seen in July and August, Prof. Konkoly reports 200 meteors seen at Nagy Tagyos during the July and August swarms, and Herr Dziewulski gives particulars of two bright meteors seen at 11h. 55·6m. (M.E.T.) and 11h. 57·6m., respectively, on July 6. At Cracow the apparent paths were 317°, −2° to 350°, +10° and 307°, +23° to 327°, +46°, respectively; the first lasted